PATENT
Attorney Docket No. 29610/CDT346

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).
Nalinkumar L. Patel et al.	
Serial No. 10/531,070	
Filed: October 10, 2003 (Int'l. Appl. No. PCT/GB2003/004406)	March 29, 2010
For: Optical Device	
Group Art Unit: 1792	Andrew M. Lawrence (Reg. No. 46,130)
Examiner: James Lin	Attorney for Applicants
Confirmation No. 2522	

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The applicants hereby request that a panel of examiners formally review the legal and factual bases of the rejections in the above-referenced application prior to the filing of an appeal brief. The applicants respectfully submit that the rejections should be withdrawn for the reasons concisely described herein.

Submitted herewith is a Notice of Appeal.

Claims 1-3 and 6-24 remain variously rejected under U.S.C. §103(a) as assertedly obvious over Aziz *et al.*, EP 1 178 546 ("Aziz") in view of Lee et al., *Synthetic Metals, 117*:249-251 (2001) ("Lee 1") and/or Lee et al., *Adv. Mater, 12(11)*:801-804 (2000) ("Lee 2") optionally in further view of Towns *et al.*, International Patent Publication No. WO 01/62869 ("Towns"), Hirai, U.S. Publication No. 2001/0028962 ("Hirai"), or Roach et al., U.S. Publication No. 2001/0055454 ("Roach"). The applicants respectfully traverse the rejections.

In the "Response to Arguments" section of final official action dated October 27, 2009, the Office asserted that:

> Aziz explicitly teaches away from annealing temperatures that substantially changes (sic) the structure of the OLED layers [0086] but rather that the annealing temperature should be below the glass transition temperature of the material having the lowest glass transition temperature of all of the materials forming the OLED [0085]. *The combination of references would have explicitly taught away from using annealing temperatures above the glass transition temperature.*

See official action dated October 27, 2009, at page 5 (emphasis added). The Office's reasoning for maintaining the claim rejections therefore seems to be premised upon the proposed combination of references teaching away from annealing temperatures above the glass transition temperature. This reasoning, however, is defective because each of the cited documents that discloses annealing a polymer film either explicitly discloses or contemplates annealing above the glass transition temperature.

Aziz discloses annealing fabricated organic light emitting devices at an annealing temperature and for an annealing period effective to (i) decrease an operating voltage of the as-fabricated organic light-emitting device, and (ii) increase an energy conversion efficiency of the as-fabricated organic light-emitting device. To this end, Aziz contemplates annealing temperatures (i) below the melting temperature of a material having the lowest melting temperature of the entire organic light-emitting device and (ii) below the glass transition temperature of a material having the lowest glass transition temperature of the entire organic light-emitting device. *See* Aziz at column 4, lines 23-41 (and especially lines 34-38). Thus, in contrast to the Office's reasoning, Aziz *contemplates* annealing fabricated organic light-emitting diodes at temperatures *above* the glass transition temperature (but below the melting temperature) of a material in the device as melting temperatures are almost always higher than glass transition temperatures (materials can have both a glass transition temperature and a melting temperature). Therfore, Aziz cannot be said to fairly teach away from "using annealing temperatures above the glass transition temperature," as suggested by the Office.

Lee 2 discloses "annealing" electroluminescent devices during and post fabrication (both pre-deposition of the cathode electrode and post-deposition of the cathode electrode). Both annealing steps are performed at temperatures above the glass transition temperature of the polymer. *See* the 1st full paragraph of the 2nd column of page 801, and the 1st full paragraph of the 2nd column of page 803. Further, Lee 2 teaches away from annealing below the glass transition temperature by stating that "heat treatments below the T_g cannot change the electrical properties because they do not alter the morphology of the emissive polymer," and indicating that such altered morphology is desirable. *See* the 1st and 2nd full paragraphs of the 2nd column of page 801. Lee 2 discloses several advantages of thermal annealing above the glass transition temperature (enhanced polymer packing, increased thermal stability of the film, better optical output, enhanced interfacial adhesion), and thus cannot be fairly said to teach annealing at lower temperatures, *much less* to teach away from "using annealing temperatures above the glass transition temperature," as suggested by the Office.

Similar annealing procedures above the glass transition temperature were performed in Lee 1 (either before or after cathode-electrode deposition). *See* the paragraph bridging the 1st and 2nd columns of page 249, and the section entitled "2. Experimental" bridging pages 249 and 250. Lee 1 further discloses that:

> Thermal *annealing above T_g is needed* to reduce the imperfection (or impurity factor) of the film and the interface in EL devices, and thus to improve the luminous efficiency.

See Lee 1 at the section entitled "2. Conclusion" on page 251 (emphasis added). Thus, like Lee 2, Lee 1 cannot be fairly said to teach annealing at lower temperatures, *much less* to teach away from "using annealing temperatures above the glass transition temperature," as suggested by the Office.

In view of the above, the Office cannot maintain that "[t]he combination of references would have explicitly taught away from using annealing temperatures above the glass transition temperature," as proposed in the official action. For this reason alone, the rejections should be removed.

Moreover, the official action indicates that "[o]nly the baking step of Lee 1 and Lee 2 were used in the rejections." *See* official action dated October 27, 2009, at

page 5. It is true that both Lee 2 and Lee 1 disclose "baking" a MEH-PPV polymer layer at 60°C, which is below its glass transition temperature of 65°C, to remove residual solvent after film casting. But the overall teachings of Lee 2 and Lee 1 focus on the benefits of annealing the polymer above the glass transition temperature, as mentioned above. Furthermore, both Lee 2 and Lee 1 couple the "baking"/solvent removal step with annealing the polymer layer above the glass transition temperature as (i) baking is believed to introduce free volume/pores/defects and (ii) annealing above the glass transition temperature is believed to reduce those defects. *See* Lee 1 at the section entitled "1. Introduction" on page 249 and Lee 2 at the 2nd full paragraph of the 2nd column of page 801. As a result of such defects (and other possible causes), Lee 1 suggests that EL polymer without any annealing treatment shows undesirable anomalous current-voltage behaviors. Thus, even if one of ordinary skill in the art were to combine Aziz with Lee 1 and/or Lee 2, one of ordinary skill in the art would not be motivated to use the baking step *without a subsequent annealing step above the glass transition temperature of the polymer* to remove the pores/defects introduced by baking. Therefore, the applicants respectfully submit that the examiner's proposed modification of Aziz in view of Lee 1 and/or Lee 2 to include baking without annealing above the glass transition temperature would not be made, but rather is based upon impermissible hindsight reconstruction.

In view of the foregoing, a *prima facie* case of obviousness cannot be sustained. Therefore, the claim rejections should be reversed.

CONCLUSION

Allowance of all pending claims is respectfully requested.

Respectfully submitted,

MARSHALL, GERSTEIN & BORUN LLP

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Andrew M. Lawrence, Reg. No. 46,130
Attorney for Applicant
233 S. Wacker Drive Suite 6300
Chicago, Illinois 60606-6357
(312) 474-6300